Southwest Microwave, Inc.

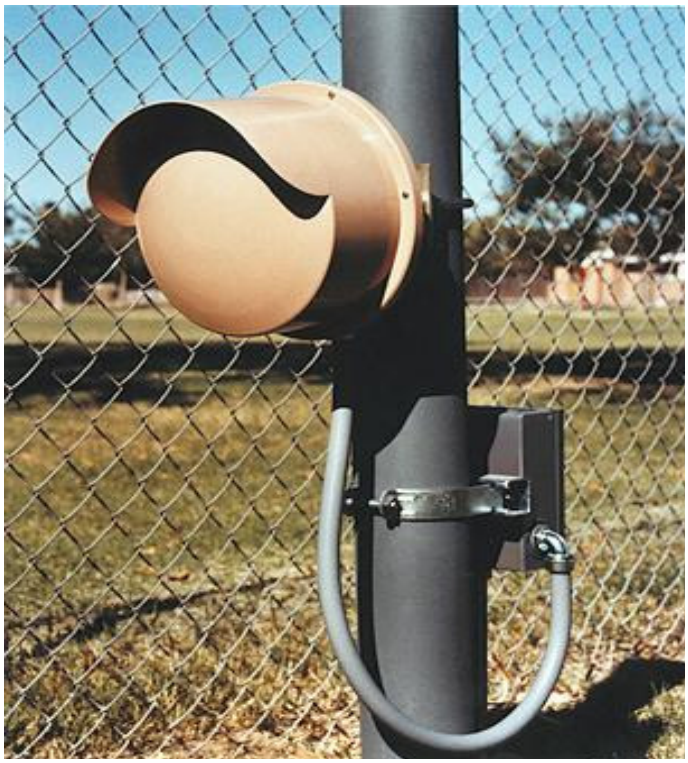
Security Systems Division

TECHNICAL MANUAL

FOR

MODEL 300B-33252

OUTDOOR MICROWAVE LINK



SOUTHWEST MICROWAVE, INC
Security Systems Division
9055 South McKemy Street
Tempe, Arizona 85284-2946
Tel: (480) 783-0201
Fax: (480) 783-0401
E-mail: infossd@southwestmicrowave.com
Web: www.southwestmicrowave.com

TABLE OF CONTENTS

Introduction 3

Description 3

Optional Equipment 8

Specifications 9

Installation Instructions 11

Alignment and Testing 17

Warranty and Equipment Return Information 19

Note: This manual applies to installation and set-up of Models 300B-33252 and 300B-33258.

Copyright Southwest Microwave, Inc. August 2007 – 300B-33252™ Printed in USA

INTRODUCTION

Model 300B-33252 Microwave Transmitter-Receiver (T/R) Link utilizes state-of-the-art technology to provide superior detection capability with simple installation and alignment. The Transmitter is powered by a Gallium Arsenide Field Effect Transistor (GaAs FET) oscillator, which requires only 20mA (at 12VDC), permitting several links to be powered from a common power supply located at the control panel or other convenient location.

Three protection pattern elements are supplied with each Model 300-33252B so that the optimum coverage pattern may be selected at site. Thus any Model 300B-33252 can be used for all T/R Link applications, whether they are short range, medium range or extended range.

Model 300B-33252 is equipped with universal mounting brackets for mounting to a variety of posts or wall structures. Built-in alignment voltage test points, compatible with standard VOM, together with four LED indicators, permit quick alignment and site troubleshooting without special test equipment.

Model 300B-33252 is also equipped with an additional feature which allows the unit to be externally synchronized to other Southwest Microwave sensors by the Model SMC10 synchronizer. See Technical Note 454. Short range, 10 feet (3m) "slaving" is also available on this unit.

DESCRIPTION

Each Model 300B-33252 consists of one Model 300B-33252T Transmitter and one Model 300B-33252R Receiver, each with universal mounting bracket. *Note: the High Rel Model 300B-33258 includes RFI/EMI shielded radomes, MB65 heavy duty position lock corrosion resistant mounting brackets, extended elevated temperature burn-in and full temperature test.* The Transmitter radiates amplitude modulated X-band energy that travels to the receiver where it is detected. The received energy is amplified and processed so that it causes an alarm relay to be energized. When an intruder approaches the beam, received energy is changed causing the relay to be de-energized, and an alarm occurs. Operation of Model 300B-33252 is illustrated in Figure 1.

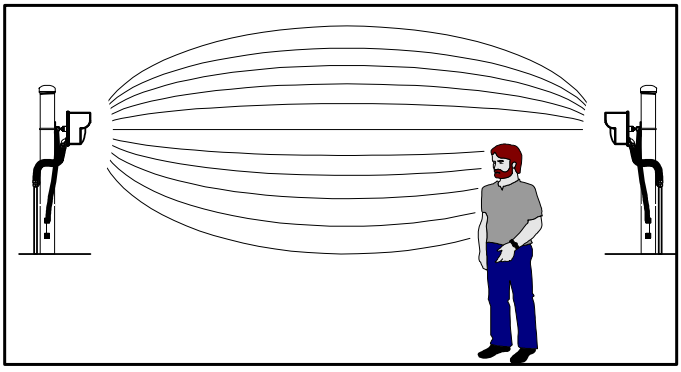


Figure 1 – Operation of T/R Link

A single Model 300B-33252 may cover a distance up to 600 feet (183m). Three pattern elements are supplied – short range with maximum range of 100 feet (30m), medium range with maximum range of 350 feet (107m) and extended range with maximum range of 600 feet (183m). The receiver is equipped with automatic gain-control (AGC) that automatically adjusts receiver for the distance to be covered.

Typical maximum width protection patterns of Model 300B-33252 are shown in Figure 2 for mounting height of 2.5 feet (.76m) above smooth earth. Maximum width is attained when Transmitter-Receiver distance is at maximum and Receiver "Sensitivity" control is set to maximum. Figure 3 illustrates how pattern width varies with Transmitter-Receiver distance and sensitivity setting for each protection pattern element. Actual patterns will vary somewhat with site topography and surface condition. Generally, lower mounting height or rougher surface will increase pattern width.

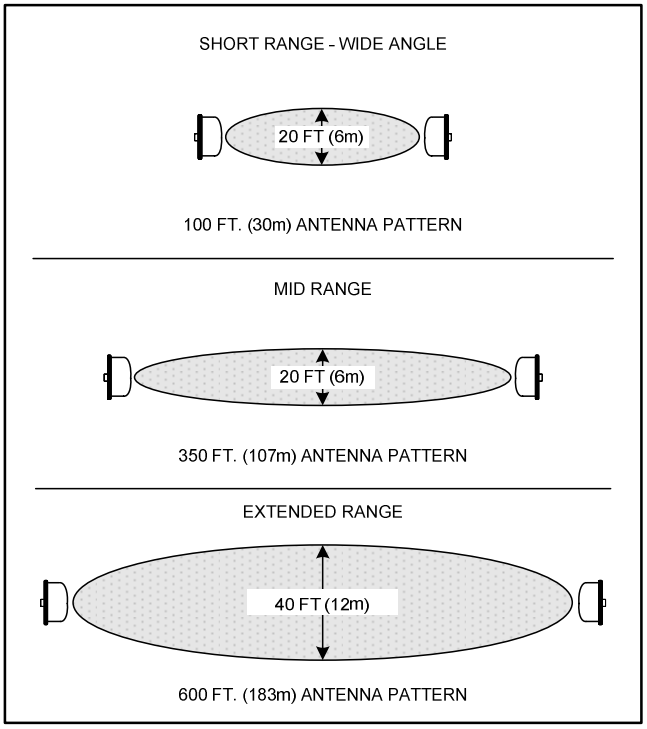


Figure 2 – Typical Maximum Horizontal Patterns

For example, if the total link distance is 175 feet (53m) with the mid-range antenna pattern element installed and the sensitivity adjustment set to mid-point, Figure 3 indicates the detection pattern width to be approximately 6 feet (1.8m).

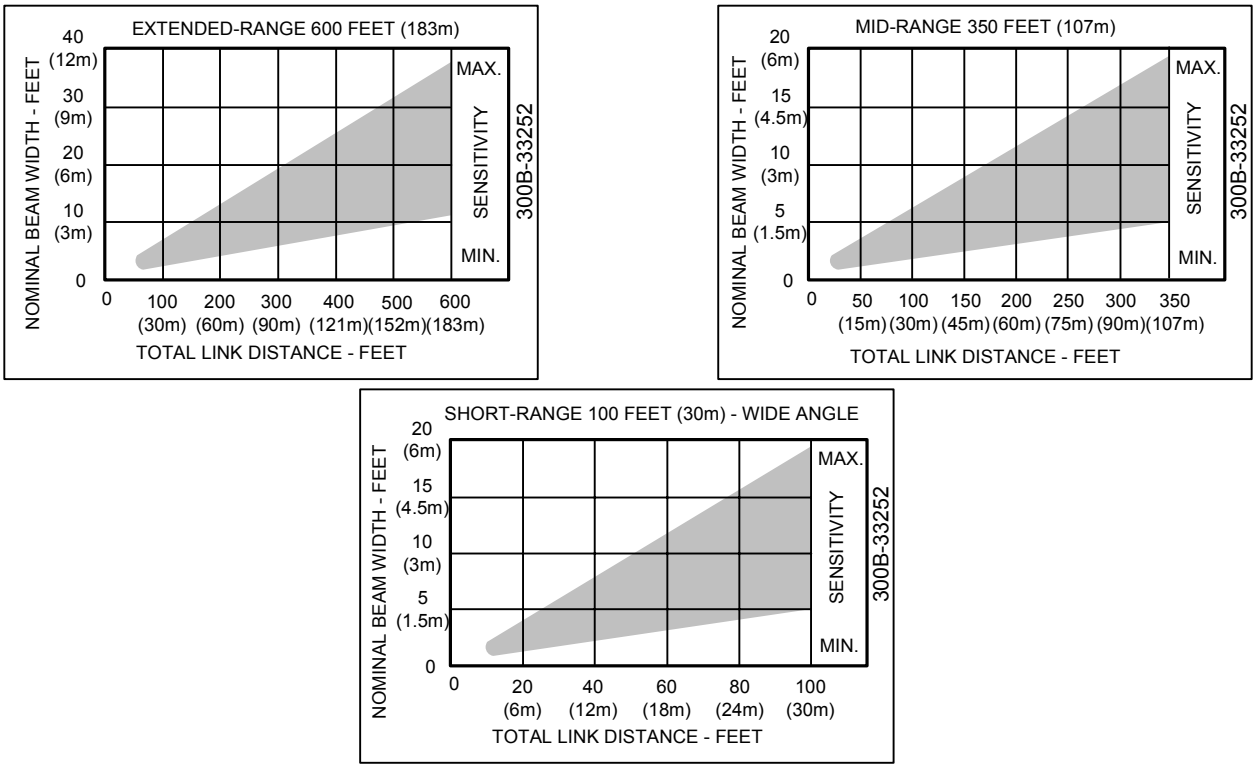


Figure 3 – Pattern Width vs. Link Distance and Sensitivity

Vertical protection pattern will also depend upon pattern element selected as well as Transmitter-Receiver distance, mounting height and "Sensitivity" Setting. Protection pattern **above** Transmitter-Receiver centerline will be approximately half to ¾ of the horizontal pattern shown above. Protection pattern **below** centerline will tend to fill area between beam centerline and ground except for a "dead zone" immediately in front of and below Transmitter and Receiver. This zone is best protected by overlapping links at ends and corners as shown in Figures 4. Figure 4 show the basic corner, intermediate and basket-weave overlap recommendations. The overlap distance required is a function of the detection requirement of the specific site. Detection of a walking/running intruder will require less of an overlap compared to sites that require detection of belly-crawling and jumping intruders.

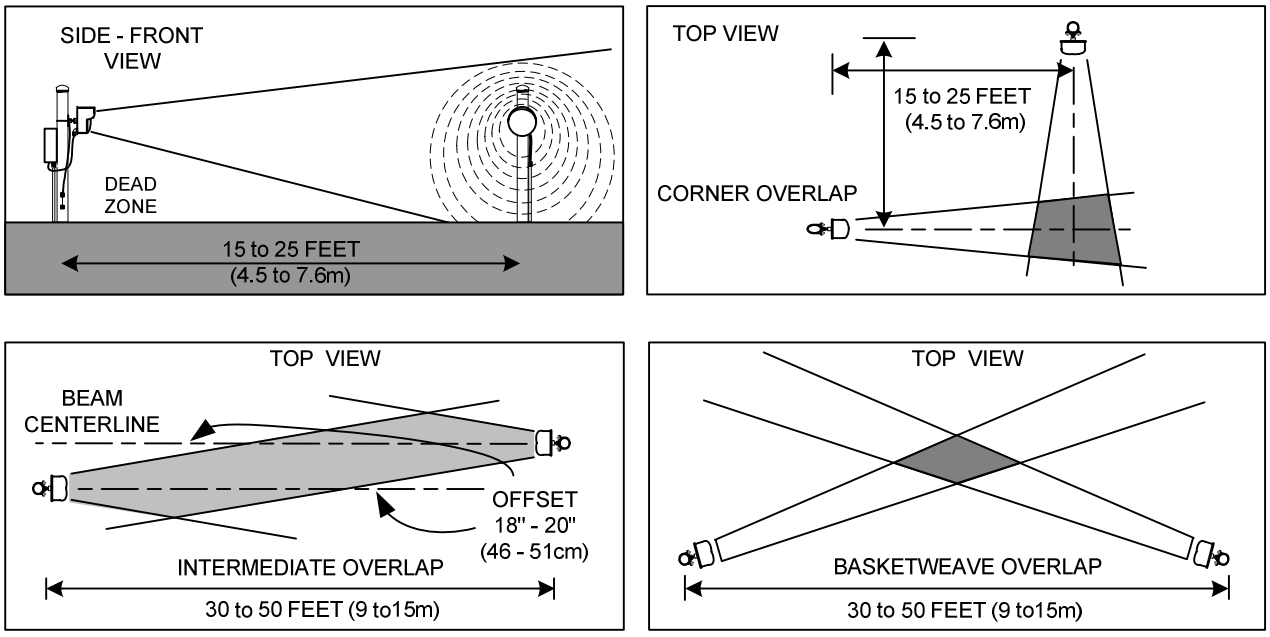


Figure 4 – Overlaps

Figure 5 shows amount of overlap required to protect against hands and knees crawling intruders, as a function of "Sensitivity" setting. For maximum security applications where detection of prone "commando style" belly crawl is required, the intermediate over-lap should be 50 feet (15m) minimum with parallel beam centerline offset of 18 inches (46cm) maximum. The corner overlaps should be 25 feet (7.5m) minimum. Terrain flatness should be no more than plus three inches or minus three inches deviation from a plane drawn between the transmitter and receiver. The zone length (Transmitter to Receiver) should not exceed 400 feet (121m).

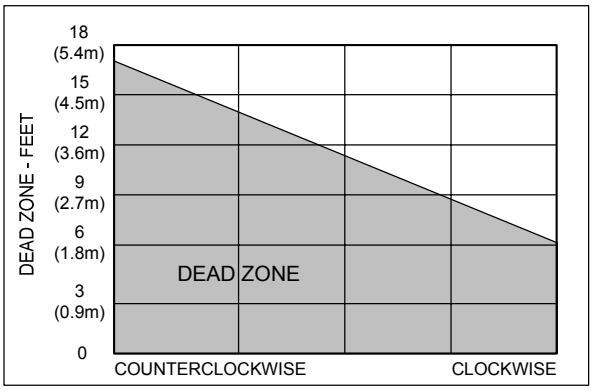


Figure 5 – "Sensitivity" vs. Dead Zone

TRANSMITTER

Model 300B-33252T Transmitter consists of two major subassemblies – RF Assembly and Transmitter Circuit Board. A block diagram is shown in Figure 6.

The RF assembly consists of a GaAs FET oscillator that generates X-band microwave energy and the parabolic antenna system with interchangeable protection pattern elements. The transmitter circuit board contains voltage regulator and modulator circuit to drive the microwave oscillator. Modulation frequency is selected from one of four channels (A, B, C or D) on the transmitter circuit board.

Two additional features have been added to the Model 300B-33252 transmitter board – a line receiver circuit which allows the transmitter to be "slaved" to either phase of a master clock and an auxiliary master output for short run, 10 feet (3m) or less, synchronization of transmitters. In the "slave" position a red LED indicated that the transmitter is "on" providing a check of the phasing. The phase of the signal can be selected by a PCB jumper to provide either an in phase (0°) or out of phase (180°) clock reset. This feature is particularly useful in multiple unit installations where mutual interference between mono-static and bi-static sensors can be a problem By proper selection of the phase, units can be alternately turned on or off at the modulation rate. When the jumper is placed in the "off" position, the Model 300B-33252 reverts back to typical free running operation.

A "test" terminal is provided on the transmitter circuit board. Application of 10.5 to 15.0 VDC (from power supply) will cause transmitter to turn off, generating a test alarm at receiver. A red "ON" LED on transmitter circuit board indicates that power is on.

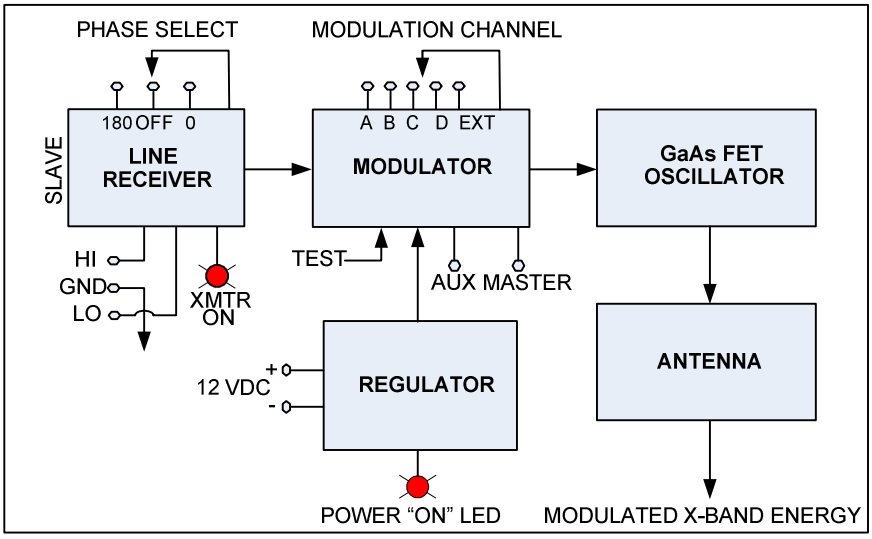


Figure 6 – Model 300B-33252T Transmitter Block Diagram

RECEIVER

Model 300B-33252R Receiver consists of three major subassemblies – RF Assembly, Demodulator Circuit Board and Power Supply Board. A block diagram of Model 300B-33252R Receiver is shown in Figure 7. The RF assembly consists of a parabolic antenna with interchangeable protection pattern elements (identical to antenna of transmitter) and a Schottky diode detector. The detector converts modulated X-band energy from transmitter into an audio frequency signal for processing by Demodulator Circuit Board.

The unit also contains a line receiver which allows the receiver to be "slaved" to either phase of an external clock. In this position, a red LED indicates when the receiver is "on" so that phasing can be checked. When the "slave" jumper is "on" the normal channel selection feature is overridden.

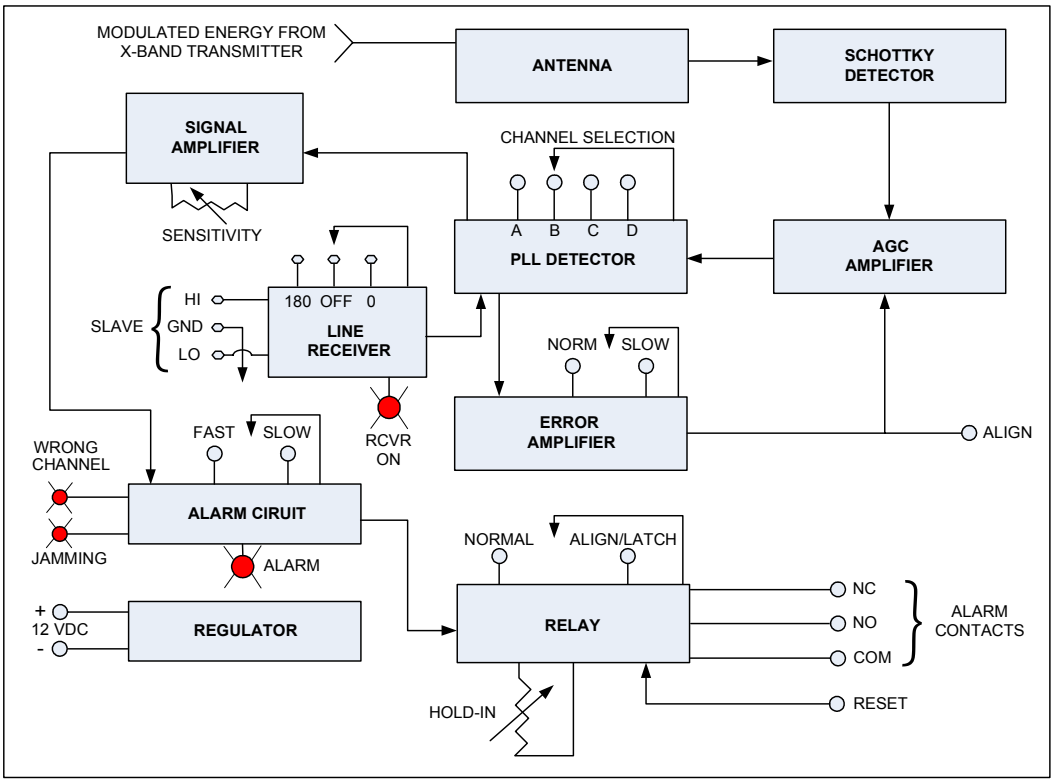


Figure 7 – Model 300B-33252R Receiver Block Diagram

The received audio signal is amplified by an automatic gain control (AGC) preamplifier enabling the preamplifier output to be held to a constant level regardless of Transmitter-Receiver distance (distance must be within maximum distance of Figure 2). Preamplifier output is applied to a phase-locked loop (PLL) detector that operates as a narrow bandpass filter at one of the modulation frequencies. Receive channel is selected by means of PCB jumper to match modulation frequency of Transmitter while rejecting spurious signals and other Transmitters.

PLL detector output is a voltage level that is held constant under normal conditions by the slow-acting AGC loop. Rapidly changing signal strength caused by a target moving into the microwave beam is not affected by AGC loop and causes an AC signal to appear at PLL detector output. Signal is amplified, filtered and compared with upper and lower alarm threshold voltages.

Whenever signal exceeds either threshold voltage, an alarm is generated. Gain of signal amplifier may be adjusted with "Sensitivity" potentiometer on circuit board to modify protection patterns per Figures 2 and 3. Signal bandwidth, affecting Model 300B-33252's response to fast moving targets, may be set to "Fast" or "Slow" with PCB jumper.

The alarm relay circuit is factory adjusted to automatically reset after approximately two seconds, but hold-in time may be adjusted between 0.5 and 60 seconds by potentiometer on Power Board Supply. Moving PCB jumper from "Normal" to "Latch" may defeat automatic reset. In this condition an alarm will cause relay to latch in the alarm position until reset with 5-15 volt pulse on reset terminal.

Model 300B-33252R Receiver is equipped with various alignment and troubleshooting features. Alignment voltage test point provides a DC voltage proportional to received signal strength, which may be measured with an ordinary VOM. A red "Alarm" LED lights whenever an intrusion occurs. A red "Wrong Channel" LED lights whenever Transmitter and Receiver are set to different modulation channels. A red "Jamming" LED lights whenever Receiver is illuminated with a second Transmitter set to the same modulation channel. "Jamming" indication may cause an alarm to be initiated.

OPTIONAL EQUIPMENT

Model PS40 Power Supply operates from 110 VAC, 50-60 Hz, and 0.5A and furnishes 13.7 VDC at up to 1.6A @ -40° to +66° C (-40° to 150° F). The Power Supply contains automatic switchover and battery charging circuitry for optional standby batteries of up to 25AH. Power supply is fused on both input and output for maximum protection.

Model PS41 Power Supply operates from 220 VAC, 50-60 Hz, and 0.25A and furnishes 13.7 VDC at up to 1.6A @ -40° to +66° C (-40° to 150° F). The Power Supply contains automatic switchover and battery charging circuitry for optional standby batteries of up to 25AH. Power supply is fused on both input and output for maximum protection.

Model PS50 Power Supply operates from a 16.5 VAC, 50-60 Hz plug-in transformer Model PT62 (110 VAC) and furnishes 13.7 VDC at up to 0.3A. It is designed for indoor operation, and is conveniently mounted inside a control panel. If mounted outdoors, it must be in a weatherproof enclosure. Model PS50 will charge a standby battery of up to 7.2AH.

Model PS51 Power Supply operates from a 16.5 VAC, 50-60 Hz plug-in transformer Model PT61 (220 VAC) and furnishes 13.7 VDC at up to 0.3A. It is designed for indoor operation, and is conveniently mounted inside a control panel. If mounted outdoors, it must be in a weatherproof enclosure. Model PS51 will charge a standby battery of up to 7.2AH.

Model BA30 – 12.6V, 7AH jelly acid, standby battery.

Model RS10 radome provides a shield that encloses Model 300B-33252 circuitry to provide additional protection from RFI/EMI interference.

Model RS13 radome provides a shield that encloses Model 300B-33252 circuitry to provide additional protection from RFI/EMI interference plus has Hydrophobic Coating to repel water and ice.

Model RM83 Performance Test Set provides indication of (1) input power supply voltage, (2) alignment, (3) sensitivity and (4) audio/visual alarm indication. Designed for use with Model 300B-33252. It is recommended for setup and maintenance testing.

Model MB65 Corrosion Resistant Mounting Bracket provides means of locking the angular direction setting of Model 300B-33252 Transmitter or Receiver. Model MB65 mounts to 4 inch (10cm) O.D.

Model BX 20 NEMA 4X SS Weatherproof Enclosure. Includes inner panel with Model PS40/PS41 power supply, two 12-position terminal strips, one 3-position AC input power shielded terminal strip and mounted tamper switch.

Model 02A15483-A01 Radome Latch Kit replaces screws on radome for quick access to sensor electronics.

Model LF115 Line Filter provides RFI/EMI, transient, surge protection for single microwave transmitter or receiver.

Model SMC10 synchplexer module allows crystal controlled selection for synchronization to Model 375C transceivers or other synchronized capable links. The board is equipped with a line driver and is capable of slaving up to 8 units over a 1000 foot (305m) distance. Reference: Technical Note # 454.

Model CRP heavy duty corrosion resistant package, per MIL Spec A-8625D, P-15328.

SPECIFICATIONS

1.0 Detection Capability

1.1 Range: 10 feet (4.6m) to 600 feet (183m).

1.2 Beam Diameter: 2 feet (.6m) to 40 feet (12.2m) depending upon link length, antenna pattern element and "Sensitivity" setting per Figure 3A, 3B, 3C.

1.3 Target: 77 pound (35kg) human walking, running, hands and knees crawling and jumping. Prone crawling or rolling 77 pound (35kg) human or simulated with a 12 inch (30cm) diameter metal sphere, detected at maximum range of 400 feet (122m).

1.4 Minimum Target Velocity: 0.1ft. /sec. (3cm/sec.)

1.5 Maximum Target Velocity: 10ft. /sec. (3m/sec.) slow setting, 50 ft. /sec. (15m. /sec.) fast setting.

2.0 Reliability

2.1 Equipment False Alarm Rate: 1/year/unit based upon signal-to-noise ratio at maximum sensitivity setting.

2.2 Probability of Detection: 0.9 minimum on 77-pound (35kg) human upright or on hands and knees.

2.3 Self Supervision (Alarm on Failure): Inherent in design (fully self-supervised).

2.4 Automatic Gain Control: Receiver sensitivity automatically adjusts to slow changes in environment. AGC range 54dB.

2.5 Cross Modulation: When installed in accordance with following installation instructions cross modulation (interference) from adjacent links will be 25dB below primary signal.

3.0 Transmittal Signal

3.1 Radiated Power: 10 mill watts peak, 5 mill watts average, square wave modulated.

3.2 Carrier Frequency: X-band (USA 10.525 GHz $\pm$ 25MH).

3.3 Modulation Frequencies: Four field-selectable modulation frequencies.

3.4 Above specifications for USA are in accordance with F.C.C. regulations. Equipment available to meet regulations of other countries.

4.0 Power Requirement

4.1 Voltage: 10.5 to 14.0VDC

4.2 Current: 20mA Transmitter, 20mA Receiver under normal ambient operating conditions.

4.3 Transmitter fused for 0.25 amps and Receiver each fused for 0.25 amps.

5.0 Alarm Indication

5.1 Alarm Relay Contacts: Primary alarm indications provided by normally open contact, normally closed contact and common terminal (Form C), contact rating 2 amps at 28VDC.

5.2 Walk Test LED: Secondary alarm indication provided by red LED on Receiver Power Supply Board.

5.3 Jamming LED: Illumination of Receiver by second Transmitter operating on same channel lights red jamming LED and may initiate alarm condition.

5.4 Tamper Switch, Transmitter and Receiver: Form C contacts rated 2.0 Amp at 28 VDC.

6.0 Alignment and Test Aids

6.1 Alignment Voltage: Available at Receiver Test Point 1. Positive voltage, suitable for 100,000 ohms/volt VOM, increases with receiver signal strength. Range 0.5-5.0 VDC.

6.2 Align Mode: PCB jumper on Receiver Demodulator Board. "Alignment Mode" provides faster AGC action for alignment and constant alarm condition to prevent leaving link in Alignment Mode.

6.3 Wrong Channel – LED: Red LED on Receiver Power Supply Board lights when Transmitter and Receiver set to different channels.

6.4 Transmitter "ON" LED: Red LED on Transmitter Power Supply Board indicates that power is on.

6.4 Alternatively, the RM82 or RM83 Performance Test Set can be used to aid in aligning and testing.

6.5 Voltages on MS connector pins are as follows:

PIN	VOLTAGES	FUNCTIONS
A	10.5 -14VDC	Input Power
B	8.0VDC $\pm$ 0.5V	Internal Regulated Power
C	0.5 Minimum	Alignment (TPI)
D	0	Chassis Ground
E	3-4VDC (Typical)	Signal Voltage (Intrusion)
F	0.1VDC (Normal) 10-12VDC (Alarm)	Alarm Status

7.0 Dimensions (Transmitter or Receiver**)**

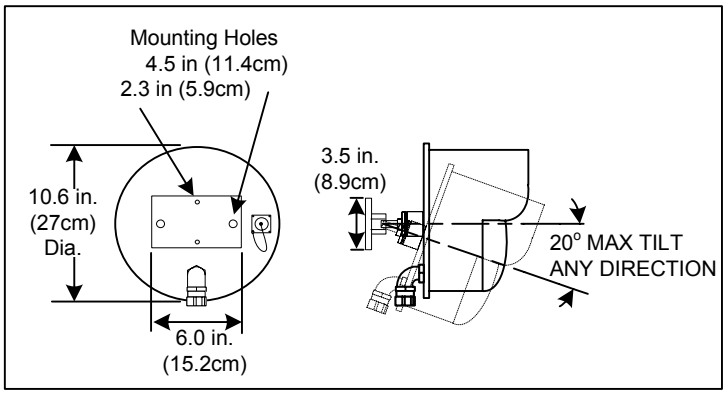


Figure 8 – Model 300B Transmitter or Receiver

8.0 Weight, Transmitter, or Receiver: 4.5 pounds (2kg).

9.0 Operating Environment

9.1 Temperature: -40° F to +150° F (-40° C to +66° C)

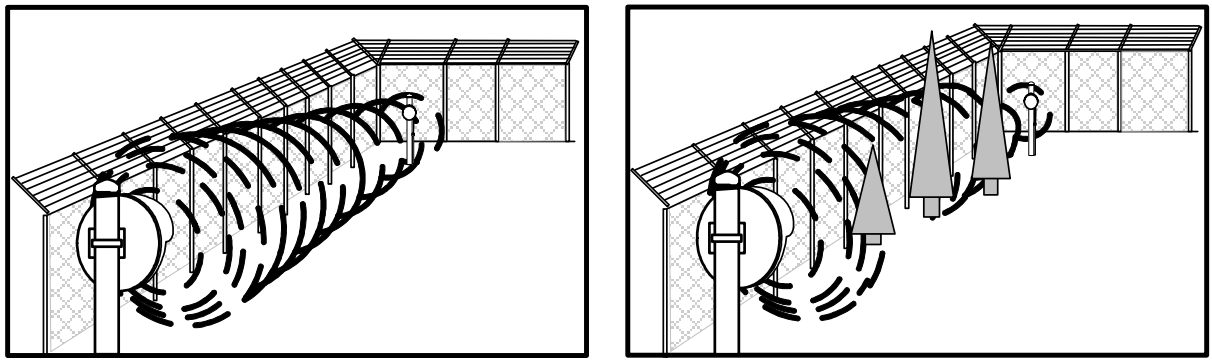
9.2 Relative Humidity: 0 to 100%.

INSTALLATION INSTRUCTIONS

A. Location of Model 300B

1. Required Area. Mode 300B-33252 must be located in an area which is free of obstructions and moving objects such as chain link fences, trees, bushes and large areas of water. See Figure 9. Large moving objects within the protection pattern will be indistinguishable from an intruder and will cause nuisance alarms.

   The clear area required for a Model 300B-33525 installation depends upon the distance to be covered by the link. Protection patterns for various conditions are given in Figures 9. In each installation the clear area must be at least as large as the protection pattern.

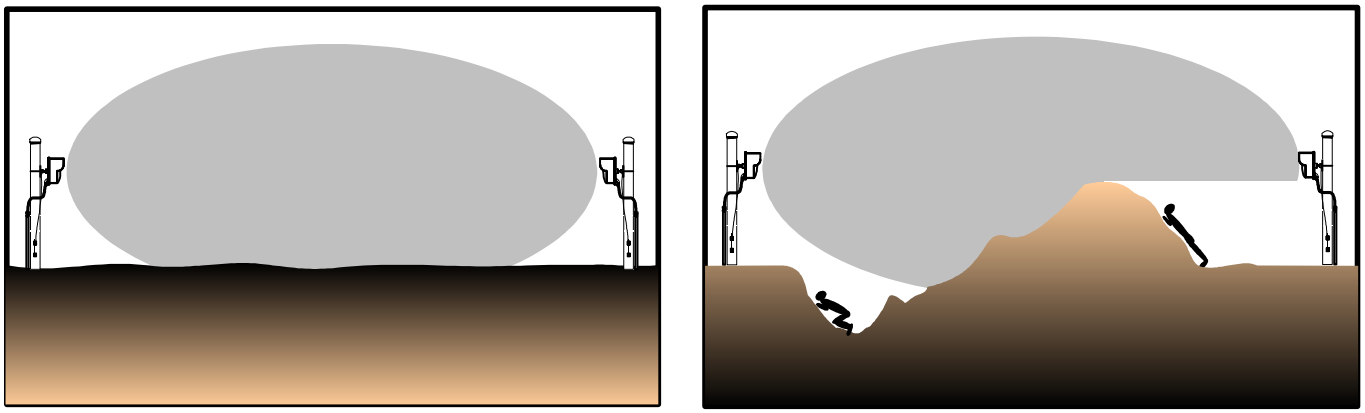


DO **DON'T**

Figure 9

2. Terrain. Since the operation of Link requires transmission of energy from Transmitter to Receiver, it is important to maintain a clear line of sight between the units. Therefore, the ground must be flat across the protected area. Any bumps, hills or ditches in the area will shadow the beam and may provide crawl space for an intruder. Bumps or hills must be leveled, and ditches filled so that the area is flat to within six (6) inches (15cm). See Figure 10.

   The protected area can be any stable, reasonably smooth material such as concrete, asphalt, tilled earth or gravel. If there is grass or vegetation in the protected are it must be kept cut to a maximum of three (3) inches (8cm) in height Snow removal should be done at this same height limitation. A Model 300B-33252 Link should not be operated over open water.

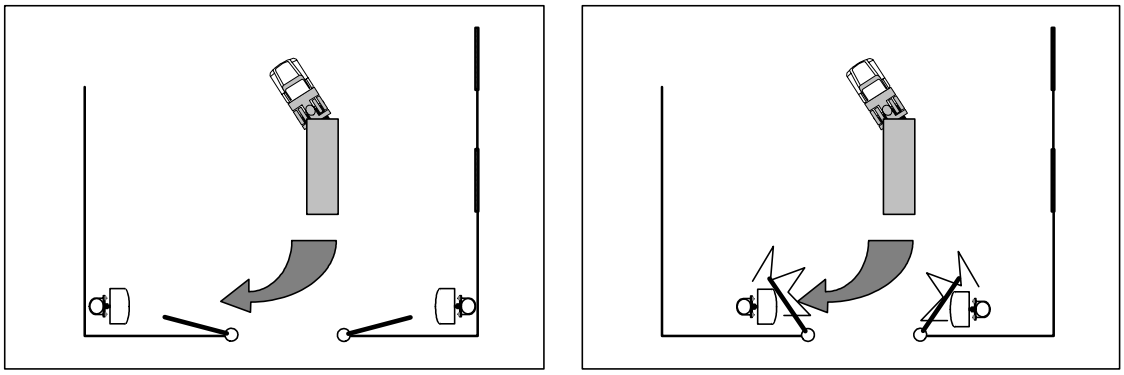


DO **DON'T**

Figure 10

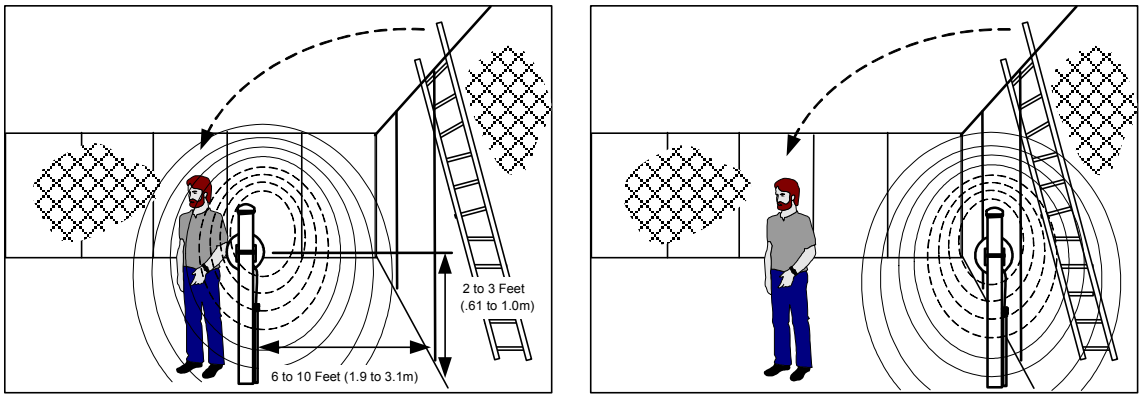
3. Physical Protection. Install the Transmitter and Receiver in locations that provide protection from accidental damage as well as from tampering. Simple devices such as bumper posts or parking guards may be used to protect equipment from damage from vehicles. See Figure 11.

4. Best Security. Choose the location that will provide best security, yet be free from false alarms. Always locate Model 300B-33252 inside a controlled access area to prevent unwanted alarms due to random foot traffic, vehicles, or large animals. Typically, units should be mounted two and one-half to three feet (0.75-1.0m) above ground level, and far enough inside fence to provide a clear area of protection. See Figures 12 & 13.



DO **DON'T**

Figure 11



DO **DON'T**

Figure 12

For maximum security it is necessary to overlap the ends of links so that the dead spot below and immediately in front of the adjoining link is protected. This type of location gives maximum possible security. A 30-foot (9m) overlap is recommended at intermediate points, and a 15-foot (4.6m) overlap is recommended at corners for minimum and medium security applications. If site demands shorter overlap, increased sensitivity will reduce dead zone, per Figure 5, but will also widen beam, per Figure 3.The offset of overlapping links in line should be measured from center of each unit (See Figure 4). Additional protection may be added at critical points by installing SOUTHWEST MICROWAVE, INC. Model 380 or 385 Monostatic Sensors, Model 405 Passive Infrared Sensor, Model MS15 or MS16 Dual Technology Sensors or stacked links.

Note form Figure 13 that at each point of overlap, either two Transmitters or two Receivers should be installed. This arrangement prevents an adjacent Transmitter and Receiver from establishing an unwanted link across the short overlap distance. If there is an odd number of links in an installation, a transmitter and receiver will need to be overlapped. This should be done in a corner as shown in Figure 13

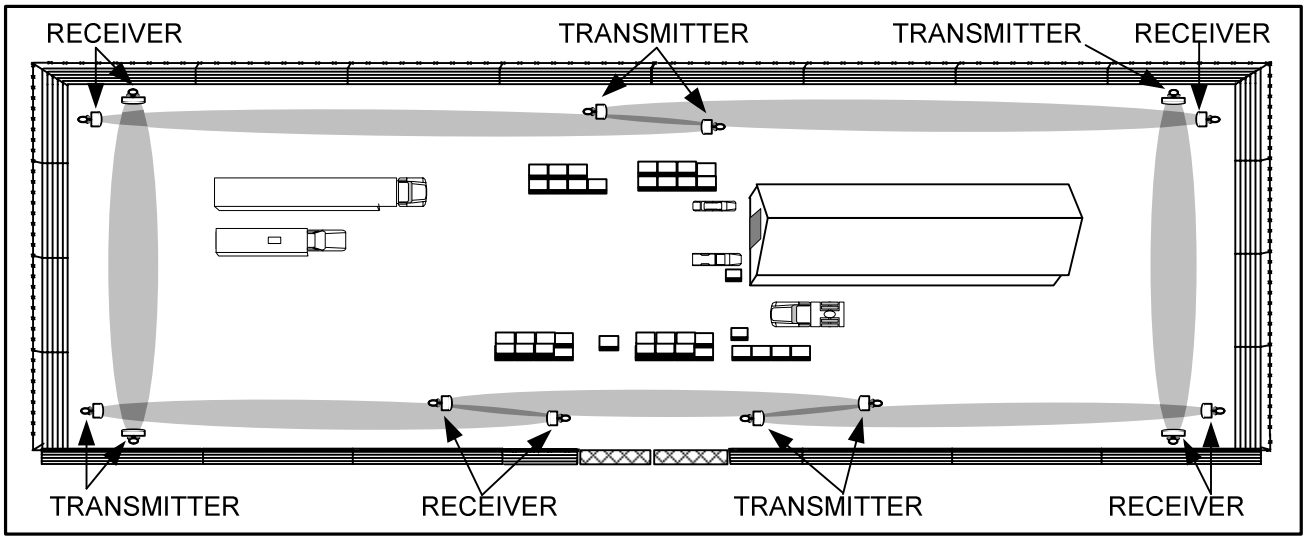


Figure 13

B. Power Supply Wiring

Model 300B-33252 requires only 20mA at 10.5-14 VDC for each Transmitter or Receiver. Therefore, sufficient power with battery standby may already be available at the site from other sensor power supplies or from the control panel itself. Any regulated "12 VDC" power supply will be adequate so long as noise and transients do not exceed 50mV and attention is paid to voltage drop in connecting wires so that voltage AT EACH TRANSMITTER OR RECEIVER remains between 10.5 and 14 VDC. Voltage drop versus wire distance in normal or slave operation for 500 feet is given in Figure 14.

WIRE GAUGE	VOLTAGE DROP PER 500FT. (150m) TRANSMITTER		VOLTAGE DROP PER 500FT. (150m) RECEIVER	
	NORMAL	SLAVE	NORMAL	SLAVE
# 16 AWG(1.29 mm dia)	.08 V	.34 V	.08 V	.44V
# 18 AWG(1.03 mm dia)	.13 V	.54V	.13 V	.7V
# 20 AWG(0.82 mm dia)	.2 V	.86V	.2 V	1.1V
# 22 AWG(0.64 mm dia)	.33 V	1.4V	.33 V	1.8V
# 24 AWG(0.51 mm dia)	.51V	2.2V	.51V	2.8V

Figure 14 – Voltage Drop vs. Wire Gauges

SOUTHWEST MICROWAVE offers two optional power supply combinations. Model PS50/Model PS51, 0.3 Amp Power Supply with Model BA30 7AH Battery will power one Model 300B-33252 T/R Link in slave mode. Model PS50/51 may be located either indoors or outdoors in a weatherproof enclosure such as SOUTHWEST MICROWAVE Model BX15. Model PS40/Model PS41, 1.6 Amp Power Supply with Model BA30 7AH Battery will power up to five Model 300B-33252 T/R Links (with proper wiring per Figure 15). Model PS40/41 may be mounted either indoors or outdoors in a rainproof enclosure such as SOUTHWEST MICROWAVE Model BX20 or BX35.

C. Mounting Model 300B T/R Link

1. Prepare a rigid mounting surface for the Model 300B-33252 Transmitter and Receiver. Do not mount units on a cyclone fence or any vibrating surface. A recommended mounting post is a 3½ inch (9cm) galvanized pipe (outside diameter 4 inches, 10cm), sunk into the ground in a concrete base, and protruding above ground level to a height of 4 feet (1.2m). Mount the Transmitter and Receiver 2½ to 3 feet (0.75 to 1.0m) above ground level and allow for height adjustment of at least plus or minus 12 inches (30cm). Height adjustment may be required during final alignment to achieve optimum protection pattern. See Figure 15. An 18-inch (46cm) ½ inch flex conduit is recommended between conduit fitting of T/R and rigid conduit or junction box.

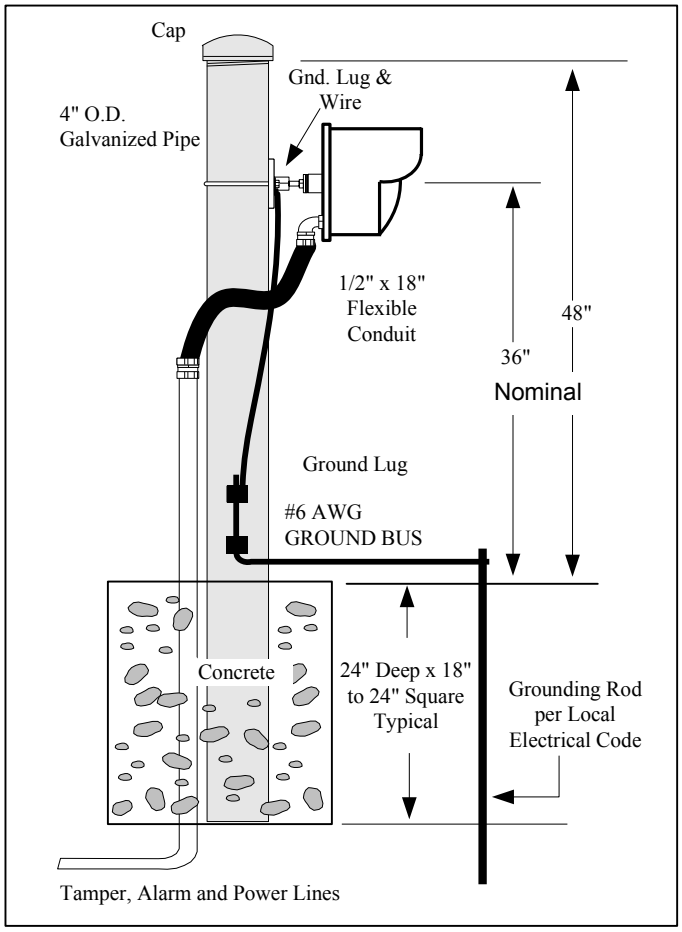


Figure 15

2. Remove the Model 300B-33252 T/R Link from the shipping containers. Separate the swivel assembly from the mounting plate by turning the large nuts counter-clockwise. Large nuts require 1 ¼ inch (32mm) open-end wrench.

3. Secure the mounting bracket to the post with U-bolt or to other mounting surface with appropriate screws or fasteners.

4. Secure the swivel assembly to Model 300B-33252 Transmitter and Receiver. The rubber washer goes against the center hub of the baseplate followed by the metal washer and attach to mounting bracket.

5. Rotate the Model 300B-33252 Transmitter and Receiver so that the conduit fittings are pointed straight down.

6. Tighten the large nuts on the swivel assembly to hold the units in place.

D. Connecting Model 300B-33252T Transmitter

Caution: DO NOT APPLY POWER UNTIL ALL WIRE CONNECTIONS HAVE BEEN MADE. SEE FOLLOWING INSTRUCTIONS.

1. Remove the radome of Model 300B-33252 Transmitter by removing the six-radome screws.

2. Insert power wires and optional tamper circuit wires through conduit fitting. Leave enough slack in wires so that Transmitter may be tilted after radome is replaced.

3. Make connections to the terminal strip according to labeled terminal functions (See Figure 16).

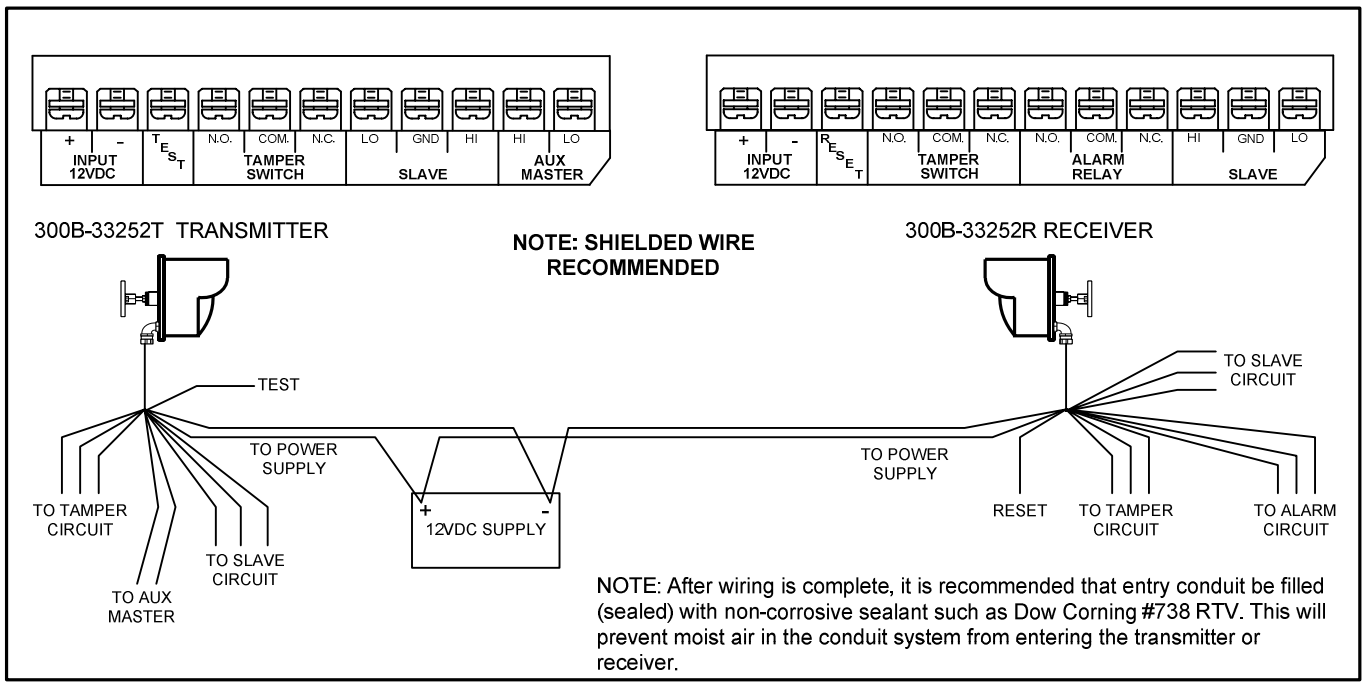


Figure 16 – Wiring Diagram

4. Attach power wires to terminal identified as + (Positive) and - (Negative) Input 12 VDC. **Observe Polarity**.

5. For protection against unauthorized openings or tampering, a tamper switch with a separate set of contacts is provided. Form C contacts (normally open, normally closed and common) are available at the Tamper Switch terminals.

6. Connect remote test wire, if used, to Test terminal on strip.

7. Connect wires to HI, LO and GND, if used, at Slave terminals. Set the "Phase" jumper to the "OFF" position or if using the external clock (SMC10) set to the proper phase. When the unit is in the "Slave" mode the channel select jumper must be in the external position. Refer to Technical Note 454 for SMC10 operation.

8. Reinstall the radome using the six radome screws.

E. Connecting Model 300B-33252R Receiver

1. Remove radome of Model 300B-33252R Receiver by removing the six-radome screws.

2. Insert power wires and alarm circuit wires through conduit fitting. Leave enough slack in wires so that Receiver may be tilted after radome is replaced.

3. Make connections to the terminal strip according to labeled terminal functions. (See Figure 16.)

4. Attach power wires to terminal identified as + (Positive) and - (Negative) Input 12VDC. **Observe Polarity**.

5. Attach alarm circuit wires as follows:

   CLOSED CIRCUIT ALARM: contacts (open on alarm) available at "Alarm Relay" COM and NC terminals.

   OPEN CIRCUIT ALARM: contacts (close on alarm) available at "Alarm Relay" COM and NO terminals.

   TAMPER ALARM: contacts available at Tamper Switch terminals. (NO, COM, NC).

6. Connect reset wire, if used, on Reset terminal on strip.

7. Connect wires to HI, LO and GND, if used, at Slave terminals. Set the "Phase" jumper to the "OFF" position or if using the external clock (SMC10) set to the proper phase. When the unit is in the "Slave" mode the channel select jumper must be in the external position. Refer to Technical Note 454 for SMC10 operation.

8. Reinstall the radome using the six radome screws.

F. Modulation Frequency Selection

The Model 300B-33252T Transmitter features four (4) field selectable modulation frequencies. Use different modulation frequencies on links operating within close proximity. Different modulation frequencies reduce the possibility of cross-link modulation or mutual interference. In addition, the transmitters can be "slaved" to an external clock (SMC10) when interfacing with Southwest Microwave transceivers to eliminate mutual interference. See Technical Note 454.

1. Select modulation channel different from the modulation of other links operating in the immediate area.

2. Attach PCB jumper wire to appropriate channel (A, B, C or D). Set the phase jumper to the "OFF" position. (See Figure 17.)

   The Model 300B-33252R Receiver also features four (4) field selectable frequencies. The Receiver and Transmitter **MUST** be operated on the same frequency or an alarm condition will result.

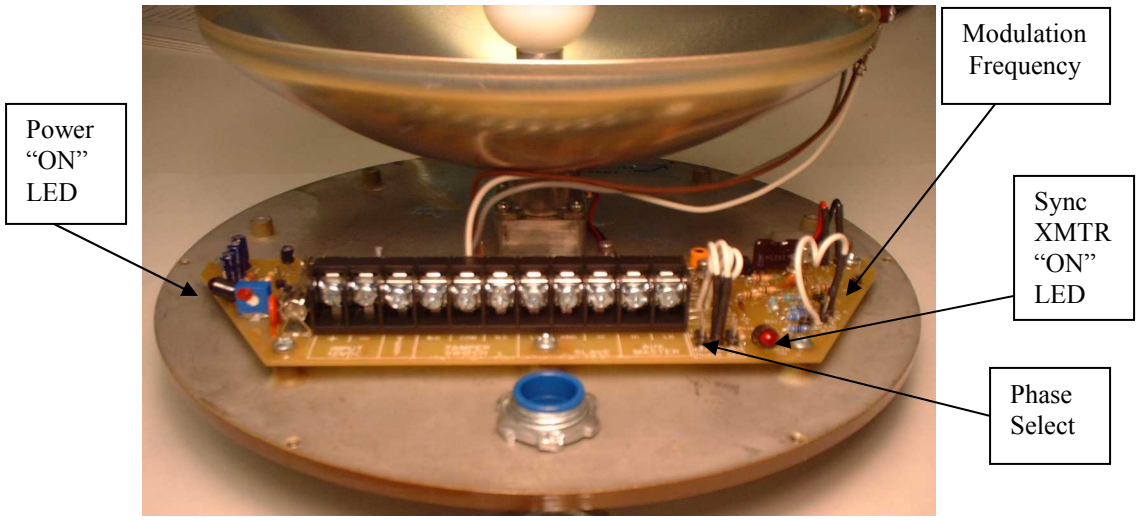


Figure 17 – Model 300B-33252T Transmitter

3. Determine the modulation frequency of the Transmitter illuminating the Receiver.

4. Attach PCB jumper wire to appropriate terminal for the same modulation channel. (See Figure 18.)

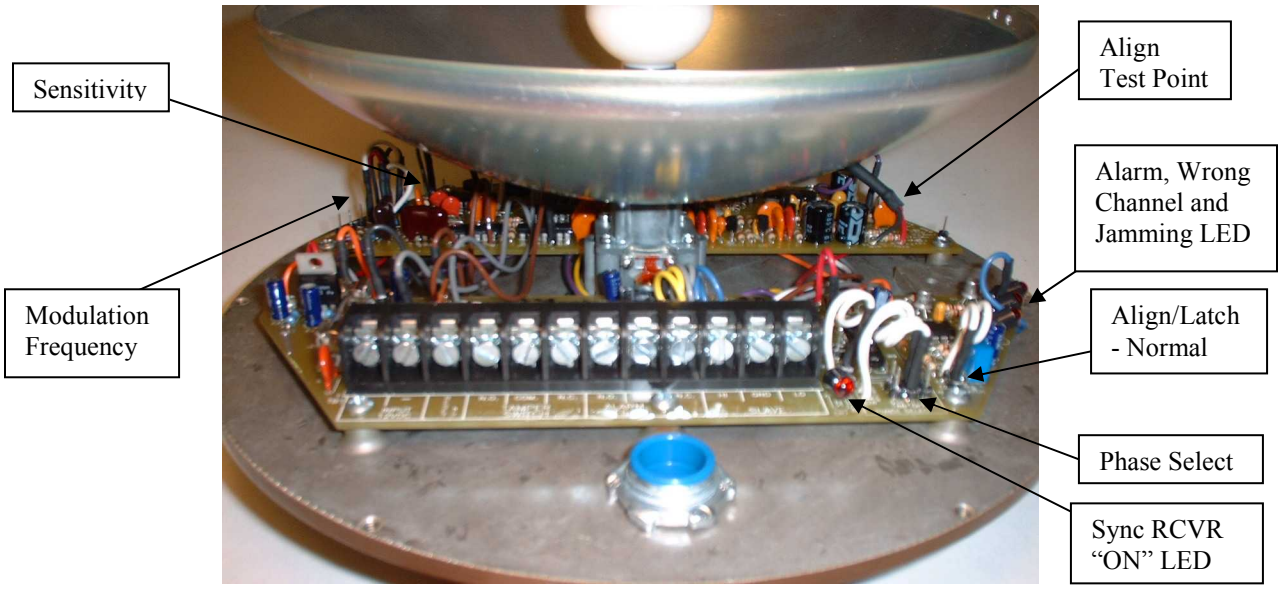


Figure 18 – Model 300BR Receiver

ANTENNA PATTERN ELEMENT INSTALLATION INSTRUCTIONS

Each Model 300B-33252 Microwave Link provides three detection patterns and ranges to 600 feet (183m). The pattern width may be varied in the field by simply installing the proper antenna pattern element and adjusting receiver sensitivity. Protection pattern width may be varied from 2 feet (0.6m) to 40 feet (12.2m) wide. (Refer to Figure.) Pattern height varies in conjunction with pattern width.

Model 300B-33252 is shipped with the EXTENDED RANGE element installed on the front of the antenna feed and secured with a PLASTIC NYLON screw on both Transmitter and Receiver (See Figure 20).

Note: Initial alignment should be performed with extended range element installed on 300B-33252 Transmitter and Receiver.

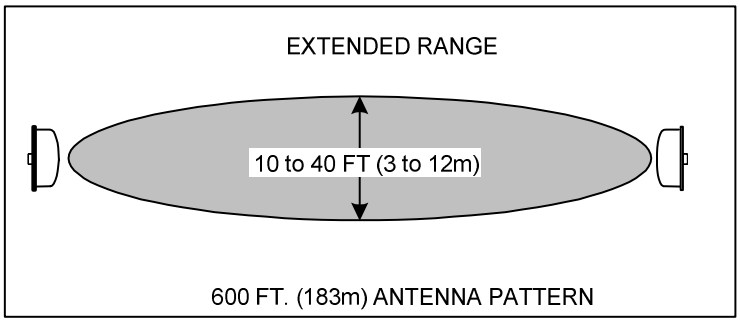


Figure 19

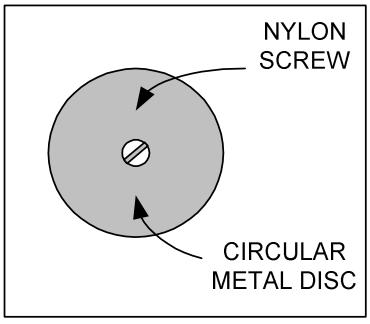


Figure 20

To change to mid-range element, proceed as follows:

NOTE: Perform the next four steps on **both** 300B-33252 Transmitter and 300B-33252 Receiver.

1. Remove six (6) screws securing plastic radome.

2. Remove PLASTIC NYLON screw (DO NOT THROW AWAY) from end of antenna feed and remove extended range element (DO NOT THROW AWAY).

3. Install MID-RANGE element (double folded disc) and secure with plastic nylon screw from step #2. Mid-range element can be mounted in the horizontal or vertical position (must be same on Transmitter and Receiver) on the front of the antenna feed as required for optimum detection. (See Figure 22).

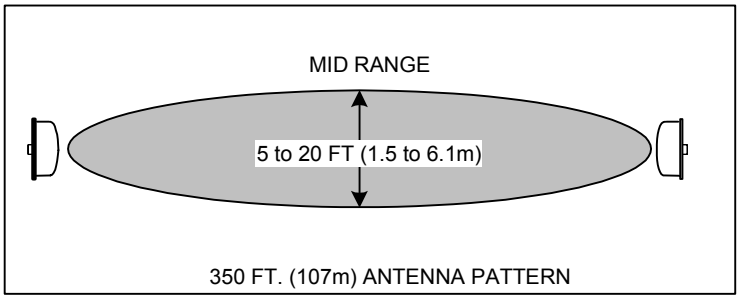


Figure 21

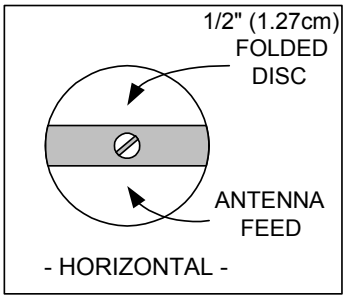


Figure22

To change to short-range element, proceed as follows:

NOTE: Perform the next four steps on **both** 300B-33252 Transmitter and 300B-33252 Receiver.

1. Remove six (6) screws securing plastic radome.

2. Remove PLASTIC NYLON screw (DO NOT THROW AWAY) from end of antenna feed and remove extended range element (DO NOT THROW AWAY).

3. Install SHORT-RANGE element (adhesive copper foil) around outer circumference of the antenna feed. (See Figure 24)

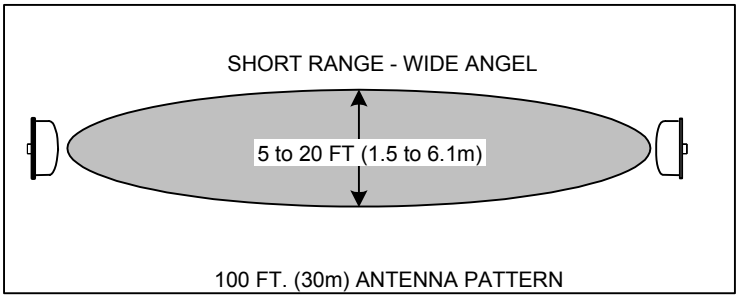


Figure 23

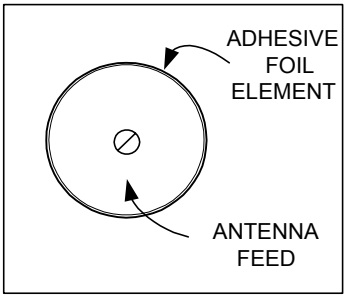


Figure 24

ALIGNMENT AND TESTING

An MS type connector has been added to the rear side of the Receiver baseplate. This connector, when used in conjunction with SOUTHWEST MICROWAVE Model RM82 or RM82 Link Performance Test Set, will facilitate field alignment and testing of Model 300B-33252 Microwave Links without removal of radome. The following outline will assist the installer in alignment and testing of the Model 300B-33252 Microwave Intrusion Link using a VOM (volt-ohm-meter) with an input impedance of 100,000 ohms/volt or greater.

1. With radomes removed, apply power to the Transmitter and Receiver.

2. Be sure the identical modulation frequency is being used on the Transmitter and Receiver of the Link to be aligned. Note: The extended range element will help ensure more precise alignment during initial set up.

3. Check for Transmitter operation by monitoring the Transmitter "ON" LED on the Transmitter Circuit Board. (See Figure 17)

4. Visually aim the Transmitter and Receiver for "bore-sight" (pointing at each other) alignment.

5. Move the Align/Latch – Normal jumper to Latch position. (See Figure 18.)

6. On Receiver, connect VOM to TP1 (Positive), and E1 GND (Negative), with meter range set to 3-5VDC. (See Figure 18.)

7. Swivel Receiver up and down, side to side, to obtain maximum meter reading. The front edge of the parabolic dish must be perpendicular to the ground surface. Tighten locking nut on mounting bracket to secure sensor in this position.

8. Raise and lower height of Receiver as required for maximum meter reading. This will provide maximum detection sensitivity." The minimum alignment voltage for the Model 300B-33252 is 0.5 VDC. Although this is the minimum voltage, proper alignment and mounting height will typically provide a greater indication on the meter."

9. Swivel Transmitter up and down, side to side, to obtain maximum meter reading. The front edge of the parabolic dish must be perpendicular to the ground surface. Tighten locking nut on mounting bracket to secure sensor in this position. The minimum alignment and voltage for the Model 300B-33252 is 0.5VDC. Although this is the minimum voltage, proper alignment and mounting height will typically give a greater indication on the meter.

10. Disconnect VOM and move Align/Latch-Normal jumper to Normal position.

11. Walk test the Link to determine width of pattern, while monitoring alarm indication by means of red "Alarm" LED.

12. Adjust pattern width by changing antenna element or by turning "SENS" potentiometer clockwise to increase and counterclockwise to decrease, until desired width is obtained. (See Figure 3.)

13. Replace radomes using all six screws.

HIGH SECURITY TEST FUNCTION

Model 300B-33252 includes a remote test and reset feature for high security applications.

1. To test the Transmitter, the Power Supply voltage (12VDC) must be applied to terminal "TEST" on the Model 300B-33252T. (See Figures 16 and 17).

2. Testing the Transmitter may be accomplished by momentarily switching "ON" the 12VDC from the Power Supply to the "TEST" terminal.

3. When the "TEST" is actuated, the Receiver will alarm. A higher degree of security can be obtained by utilizing the "Latch" function of the Model 300B-33252R Receiver.

4. Connect the "Align/Latch – Normal" PCB jumper to "Align/Latch" position. This will cause the Receiver to latch into the alarm state when either the "TEST" function is used at the Transmitter or an intrusion of the link has occurred.

5. To reset the link to the normal non-alarm condition, 5-15 VDC must be applied to terminal "Reset" on the Model 300BR. (See Figures 16 and 18.)

By utilizing both the "Test" and "Reset" functions, the link can be tested and secured from a remote point.

PREVENTIVE MAINTENANCE

Model 300B-33252 requires no calibration other than alignment and sensitivity adjustment during installation. To maintain a trouble free system the following is recommended.

1. Wax the radomes every 3 to 6 months. (At maximum security installations, where detection of prone crawling targets is required, wax once a month.)

2. Keep the isolation area clean and free of tall grass, weeds, debris, and obstructions.

3. Upon initial installation, establish a zone data chart. Record input supply voltage, zone distance, transmitter/receiver mounting height, alignment voltage, modulation channel, sensitivity setting, and battery voltages.

4. If standby batteries are used, they should be functionally tested every three months.

5. A site inspection should be performed every six months. The inspection should include: verifying data from Step 3, checking for physical damage (cracks, leaks, corrosion, etc.) checking for isolation zone changes (washouts, materials placement, vegetation growth, loose fence fabric, etc.)

For troubleshooting information, please contact the factory about Model 300B-33252 Service Manual.

LIMITED WARRANTY

SOUTHWEST MICROWAVE, INC. warrants each of its products to be free from defects in materials and workmanship. The limit of liability under this warranty is to repair or replace any products or part thereof which shall within one year after delivery to the original user be returned, shipping costs prepaid and insured, to SOUTHWEST MICROWAVE, INC. at its plant in Tempe, Arizona, or authorized Warranty Service Company, and which shall have been found to be defective upon examination by SOUTHWEST MICROWAVE, INC. or authorized Warranty Service Company.

This warranty shall be limited to the repair or replacement of SOUTHWEST MICROWAVE, INC. products and shall not extend to any incidental or consequential damages there from. Disassembly of any product by anyone other than an authorized representative of SOUTHWEST MICROWAVE, INC. voids the obligations of SOUTHWEST MICROWAVE, INC. to repair or replace any products so disassembled.

Excluded from this warranty are fuses and batteries except to the extent that the original manufacturer warrants such parts and such warranty is marked on the product. Claim under warranty for fuses or batteries should be made by the purchaser directly to the manufacturer.

Warranty returns must first be authorized by SOUTHWEST MICROWAVE, INC. or authorized Warranty Service Company.

SOUTHWEST MICROWAVE, INC. reserves the right to make changes in design on any of its products without incurring any obligation to make the same changes on units previously purchased.

THIS WARRANTY IS THE EXTENT OF THE OBLIGATIONS OR LIABILITIES ASSUMED BY SOUTHWEST MICROWAVE, INC. WITH RESPECT TO ITS PRODUCTS AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY WARRANTY OF MERCHANTABILITY OR FITNESS. SOUTHWEST MICROWAVE, INC. SHALL NOT BE LIABLE FOR CONSEQUENTIAL DAMAGES AND ITS LIABILITY IS EXPRESSLY LIMITED TO THE OBLIGATIONS EXPRESSED HEREIN. SOUTHWEST MICROWAVE, INC. NEITHER ASSUMES NOR AUTHORIZES ANY OTHER PERSON TO ASSUME FOR IT ANY OTHER WARRANTY CONCERNING ITS PRODUCTS.

RETURNING EQUIPMENT UNDER WARRANTY

As per the provisions set forth in our Security Products warranty, any person desiring to return equipment to SOUTHWEST MICROWAVE, INC. for any reason, must first contact SOUTHWEST MICROWAVE, INC. for authorization of return.

An authorization number will be issued at the time of authorization, and this number will appear on all correspondence, invoices and credits pertaining to subject equipment.

ALL SOUTHWEST MICROWAVE, INC. sensors and power supplies are provided with a serial number at the time of manufacture. In order to accurately and efficiently supply replacement parts, perform repair service, or issue credit on equipment being returned to SOUTHWEST MICROWAVE, INC., it is essential that SOUTHWEST MICROWAVE, INC. be advised of the serial number of the equipment prior to authorization for return. This notification may be made by telephone or by mail.

RETURNING EQUIPMENT FOR NON-WARRANTY REPAIR

Return of equipment out of warranty must first be authorized by SOUTHWEST MICROWAVE, INC. at which time a return authorization number will be issued. The returned equipment must be accompanied by an evaluation repair purchase order. Returned equipment will be examined and customer advised of cost of repair or replacement.

REPLACEMENT PARTS

To order a replacement or module, specify the complete part number and serial number and address the order or contact us at:

SOUTHWEST MICROWAVE, INC.
9055 South McKemy Street
Tempe, Arizona 85284-2946
TEL: (480) 783-0201
FAX: (480) 783-0401
Infossd@southwestmicrowave.com
www.southwestmicrowave.com